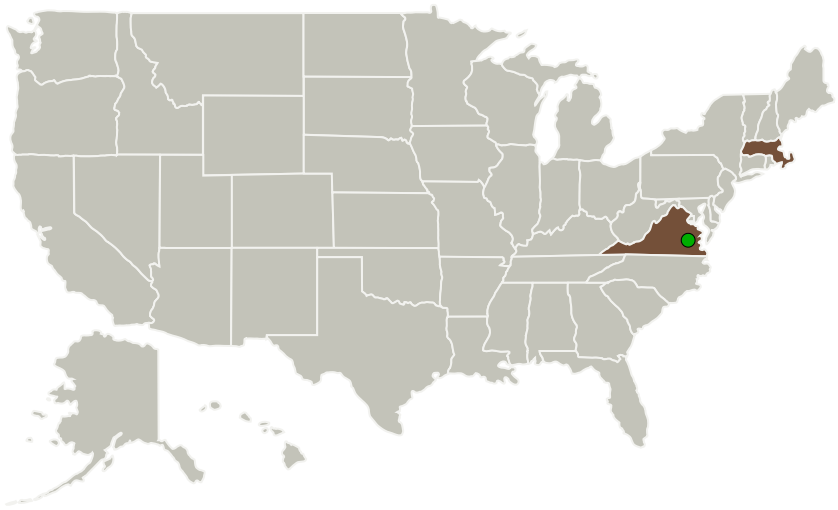
Pulsed, Single-Frequency, 2-um Seed Source for Coherent LIDAR Applications, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

The primary objective of the proposed Phase II effort is to develop and deliver a ruggedized, single-frequency, mJ-level, 2050-nm master oscillator ⇔ power amplifier system suitable for coherent LIDAR applications. The laser system is based on a low-average power, pulsed, single-frequency, 2-um Ho-laser source. Pulsed operation of the Ho-oscillator is achieved via passive Q-switching using robust Cr2+-doped saturable absorbers. Development of such pulsed seed sources enables the design of compact, rugged, reliable and efficient LIDAR transmitters based on all-amplifier architecture. Direct diode-pumping using the latest 1.9-um diode laser technology provides improved oscillator reliability and compactness. Efficient, Tm:fiber laser pumped, bulk Ho:YLF single-stage amplifier provides energy scaling to mJ level. The choice of a 2-um Ho-laser material (as opposed to 1.5-um Er-lasers) enables efficient power/energy scaling of the pulsed seed oscillator output in high-gain Ho-amplifiers. This approach decreases the number of amplifying stages, simplifies the overall design and packaging, and improves the electrical efficiency of the complete laser system as compared to the current technology.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Q-Peak, Inc.	Lead Organization	Industry	Bedford, Massachusetts
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Transitions

June 2011: Project Start

September 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139244)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Q-Peak, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Alex Dergachev

Co-Investigator:

Alex Dergachev

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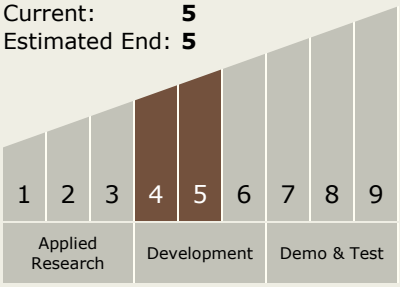
Completed Technology Project (2011 - 2013)

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System